

## **ABSTRACT**

This invention provides an anode-free, passive and versatile cathodic protection method to robustly achieve anti-corrosion purposes on a wide range of materials (including metals, nonmetals and composites) under various situations for very long time, by utilizing beta emitters such as nickel-63. Normally, radioisotopes, other than the beta emitters adopted in this invention, are considered hazardous when applied within our daily environment. For this reason, long-life (e.g., on the order of 100 years, therefore of small decay constant), low-energy (much less than the MeV level) beta emitters, such as the adopted nickel-63, are always overlooked for such crucial anti-corrosion applications.